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ABSTRACT

A sintered high temperature superconducting (HTS) ceramic electric lead formed as three-dimensional (3D) HTS macro-ceramic solid product with honeycomb-like superconductive nano-architecture comprises substantially uniformly aligned nano-size HTS ceramic crystal grains, silicate glass nano-thick films, and nano-size silver and/or inorganic dots that locate in nano-thick boundary areas of the superconductor ceramic crystal grains, and the nano-size films or dots provide honeycomb-like 3D nano-size network within the 3D HTS macro-ceramic solid product or HTS ceramic lead, and the electric lead is superconducting at liquid nitrogen cooling temperature. The superconductive nano-architecture facilitates or controls substantially higher electro-magnetic and consumable mechanical properties, reliability and durability of the HTS ceramic electric leads.